

## CLAIMS

What is claimed is:

1. An eccentric shaft comprising:
  - an elongated cylindrical body;
  - at least one small eccentric disc extending radially from said body;
  - at least one concentric gear flange extending radially from said body, said body, disc and flange being formed as a single integral forging;
  - a relatively large eccentric disc shrink-fitted and keyed to said small disc, the diameters of said discs being related that the center of said large disc describes a crank circle entirely within said small disc on rotation of said shaft; and
  - at least one sleeve affixed to said body, said sleeve comprising ports capable of transmitting fluid through a portion of said sleeve to an outer circumference of said sleeve.
2. A shaft as defined in claim 1 in which there are a plurality of said small discs spaced uniformly along the length of said shaft, and a corresponding member of large discs shrink-fitted and keyed to the small disc, said gear flange being located between two of said small discs.
3. A shaft as defined in claim 1 comprising in addition bearing retainers at the outer circumference of said large disc, the only torque on the shrink-fit being internal friction of bearings mounted in said retainers.
4. A shaft as defined in claim 1 in which a junction between the at least one small eccentric disc and elongated cylindrical body is stress-relieved.
5. A shaft as defined in claim 4 in which said junction is shot-peened.
6. An eccentric shaft comprising:
  - an elongated cylindrical body;
  - at least one small eccentric disc extending radially from said body;

at least one concentric gear flange extending radially from said body, said body, disc and flange being formed as a single integral forging;

a relatively large eccentric disc shrink-fitted and keyed to said small disc, the diameters of said discs being related that the center of said large disc describes a crank circle entirely within said small disc on rotation of said shaft; and

a junction between said disc and said body, said junction being stress-relieved.

7. A shaft as defined in claim 6 in which said junction is shot-peened.

8. A shaft as defined in claim 6 in which there are a plurality of said small discs spaced uniformly along the length of said shaft, and a corresponding member of large discs shrink-fitted and keyed to the small disc, said gear flange being located between two of said small discs.

9. A shaft as defined in claim 1 comprising in addition bearing retainers at the outer circumference of said large disc, the only torque on the shrink-fit being internal friction of bearings mounted in said retainers.

10. A shaft as defined in claim 6, further comprising at least one sleeve affixed to said body, said sleeve comprising ports capable of transmitting fluid through a portion of said sleeve to an outer circumference of said sleeve.